

Radar Imaging Experiments for Land-mine Detection *

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Abstract

In previous reports[1-3], we have described a miniature radar called Micropower Impulse Radar (MIR) and developed at the Lawrence Livermore National Laboratory (LLNL) for many applications in short-range motion sensing, ranging, and underground imaging. This new radar technology is compact, low-cost, low power, and can easily be assembled into arrays to form complete ground penetrating radar imaging systems. We have coupled a single transmit/receive sensor with imaging software running on a portable laptop computer to generate synthetic aperture images of anti-tank mines. LLNL has also developed tomographic reconstruction and signal processing software capable of producing high-resolution 2-D and 3-D images of objects buried in materials like soil or concrete from stand-off radar data [3]. Preliminary test results have shown that a radar imaging system using these technologies has the ability to image both metallic and plastic anti-vehicular mines in up to 15 cm of moist soil. We have since made extensions to the MIR and tested it under various conditions. In particular, we have shown detections of anti-personnel mines in cluttered environments and have designed an array of MIR's that could be man-portable. The MIR already solves many issues inherent with most ground-penetrating radar systems; i.e., the size, weight, power-use, and cost are all extremely favorable for AP mine detection. In this presentation, we will present work in-progress to show the efficacy of the MIR to the mine detection problem.

References

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